

REMARKS

By the present Amendment, claims 1-10 are cancelled and claims 11-21 are added. This leaves claims 11-21 pending in the application, with claim 11 being independent.

Substitute Specification

The specification is revised to eliminate grammatical and idiomatic errors in the originally presented specification. The number and nature of the changes made in the specification would render it difficult to consider the case and to arrange the papers for printing or copying. Thus, the substitute specification will facilitate processing of the application. The substitute specification includes no "new matter". Pursuant to M.P.E.P. § 608.01(q), voluntarily filed, substitute specifications under these circumstances should normally be accepted. A marked-up copy of the original specification is appended hereto.

Objections to the Drawings

The drawings are objected to under 37 C.F.R. § 1.83(a) for allegedly failing to show the second and third filter units as recited, for example, in claim 5. However, those filter units are adequately shown by the filter units 12, 14 and 16 in Figs. 1 and 2. Thus, reconsideration and withdrawal of this objection is requested.

Claim Objections and Rejections Under 35 U.S.C. § 112, Second Paragraph

Original claims 1-4, 7-8 and 10 are objected to and/or stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. By the present Amendment, the originally filed claims have been rewritten to avoid the language alleged to be indefinite or lacking sufficient

antecedent basis in the Office Action. All language of the presently pending claims is now believed to be clear and definite.

Thus, the pending claims are definite and comply with 35 U.S.C. § 112.

Rejections Under 35 U.S.C. § 102 and § 103

Claim 11 covers a filter element for filtering fluids comprising outer, middle and inner filter units 12, 14 and 16 and outer, middle and inner support units 24, 26 and 30. The filter units are arranged concentrically about a longitudinal axis. The support elements are arranged concentrically about the longitudinal axis and are disposed in an alternating succession with the filter units. The outer, middle and inner support elements support and partially engage the outer, middle and inner filter units, respectively, in directions of fluid streams therethrough. The fluid receiving channels 28 are on a side of each of the middle and outer support elements 26 and 24 facing the respective filter units. The channels are bordered laterally by longitudinal ribs on the support elements, extend along spiral tracts on the outer and middle support elements and have two free ends emerging on opposing ends of the middle and outer support elements. The channels extend continuously without repeated deflections of the fluid streams therein and only partially encompassing the respective support elements forming a twisted guide for fluid flow. Conduit 22 conveys fluid to be filtered from outside the outer and inner filter units to inner clean sides thereof and from one side of the middle filter unit to an opposite clean side thereof.

In this manner, new claim 11 basically combines the limitations of claims 1, 5 and 7. The filter element, as claimed, provides reliable operation without failure and with a high degree of

performance, particularly relative to the need for expending energy to convey the fluid through the filter element.

Claims 1-4, 6, 7, 9 and 10 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,104,534 to Branchcomb. The Branchcomb patent is cited as disclosing a filter element having support elements 152 and 156 and filter units 150 and 154 with the support elements having spiral shaped channels. The channels allegedly have free ends merging on the opposite ends of support and extending continuously without deflections of the fluid stream and only partially encompassing the support element. Relative to claim 2, the Branchcomb support elements 152 and 156 allegedly form support tubes bordering laterally by projecting longitudinal ribs. Relative to claim 3, the Branchcomb channels are allegedly located on the peripheral side of the support tube. Relative to claim 4, the Branchcomb ribs are allegedly arranged in pairs. Relative to claim 6, the inner support element 154 allegedly has passages with the channel guide for fluid flow. Relative to claim 7, the Branchcomb allegedly has the claimed fluid flow. Relative to claim 9, the Branchcomb filter elements are allegedly concentric to the longitudinal axis. Relative to claim 10, the Branchcomb channels are alleged to have a tilt of 10 degrees to 30 degrees and preferably 15 degrees relative to an axis parallel to the longitudinal axis of the filter element.

Claim 8 stands rejected as being anticipated under 35 U.S.C. § 102 or obvious under 35 U.S.C. § 103 over the Branchcomb patent. The alleged process of limitations are considered to be inadequate to distinguish a claim or as being obvious.

Claim 5 stands rejected under 35 U.S.C. § 103 as being unpatentable over the Branchcomb patent in view of U.S. Patent No. 2,865,510 to Greene. The Greene patent is cited

for the use of three support elements and filter units (A, B and C). In support of the rejection, it is contended that it would be obvious to form the Branchcomb patents with three support elements and three filter elements.

Claim 11 is patentably distinguishable over the cited patents by the combination of outer, middle and inner filter units and support elements arranged concentrically about the longitudinal axis and disposed in an alternating succession and by the conveying of fluid to be filtered from the outside to the inside of the outer and inner filter units and from one side of the middle filter unit to its opposite clean side. None of the cited patents, particularly the Branchcomb and Greene patents, considered individually or in any obvious combination thereof disclose or render obvious these features.

The Branchcomb patent discloses a filter having four helical pleated filter elements arranged from the outside in by elements 150, 152, 154 and 156 concentrically inside pipe 112. The outside pair of filter elements 150 and 152, have helical pleats 130 spiraling in opposite directions so that the inner pleats of filter element 150 fit against the exterior pleats of filter element 152 to support each filter element. Filter elements 154 and 156 are arranged and support each other in a similar manner. Fluid to be filtered enters through inlet 114 and passage holes 137 such that fluid to be filtered flows from inlet 114 into interior spaces 160 and 166. In this manner, the fluid to be filtered appears to flow from the outside in through filter element 150, from the inside out through filter element 152, from the outside in through filter element 154 and from the inside out through filter element 156.

The Branchcomb members 152 and 156 are filter elements or filter units, and are not support elements, as alleged. While such elements have spiral pleats, such pleats are not

disclosed as forming channels that extend continuously without repeated reflections to provide twisted guide channels for fluid flow, particularly since fluid flows through the Branchcomb filter elements. Moreover, the Branchcomb patent does not have the conduits providing the flow from the outside in in its outer and inner filter units and from one side to an opposite side of its middle filter unit, as claimed.

Such deficiencies are not satisfied by the Greene patent. The Greene patent merely has three filtering units A, B and C of circular shape and uniform height, with each having metal mesh on its outer surface. Fluid to be filtered is pumped in the center of the three filtering units via pipe 31 and then passes sequentially through filtering unit C to filtering unit B and finally exiting through filtering unit A. Thus, the Greene arrangement only discloses the use of three filtering units arranged in a manner for sequential filtering and not simultaneous filtering, as in the Branchcomb patent and the present claimed invention. Particularly, the Greene patent does not provide the three filtering units in combination with the conduits providing the specific flow through arrangements provided to balance the overall assembly.

Accordingly, claim 11 is patentably distinguishable over the Branchcomb and Greene patents. None of the other cited patents cure these deficiencies in the Branchcomb and Greene patents.

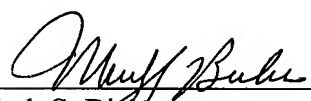
Claims 12-21, being dependent upon claim 11, are also allowable for the above reasons. Moreover, these dependent claims recited additional features further distinguishing them over the cited patents. Specifically, the support tube of claim 12, the support channels on both sides of the middle and outer support elements of claim 13, the crosspieces on the support tubes forming the longitudinal ribs of claim 14, the longitudinal ribs being connected in pairs to provide support

surfaces and bases of claim 15, the inner support element having passages forming a guide channel for fluid flow of claim 16, the filter units comprising a cylindrical mat of equal linear dimensions of claim 17, the 20 channels of claim 18, the tilt angle range of claim 19, the tilt angle of claim 20, and the structure of the outer and middle support elements preventing flow therethrough and limiting flow along their surfaces of claim 21 are not anticipated or rendered obvious by the cited patents, particularly within the overall claimed combinations.

Particularly, as to claim 17, the Branchcomb patent specifically discloses that filter elements 152 and 154 are of different sizes relative to filter elements 152 and 154 (see column 4, lines 63-67). Further, the limitation of each filter unit being a cylindrical mat, is not a product-by-process limitation but is a structural limitation. Thus, such limitation must be considered and given patentable weight.

In view of the foregoing, claims 11-21 are allowable. Prompt and favorable action is solicited.

Respectfully submitted,



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